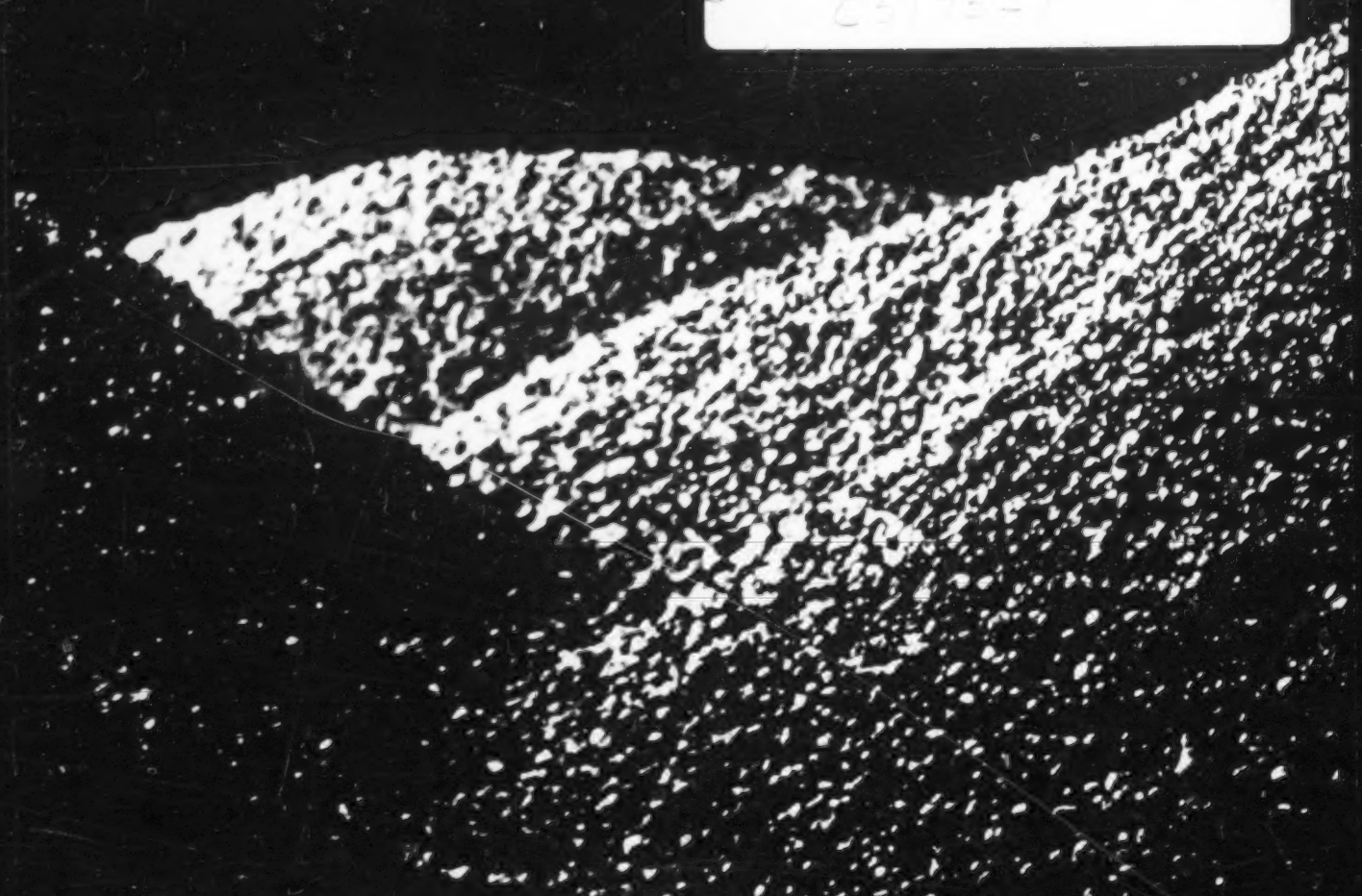
# Rubber World

The technical service magazine for the rubber industry

Volume 188, No. 3 June 1983



## Carbon black's influence on treadwear and hysteresis

Tech Service
'Bumping off' an old problem
page 18

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# Rubber World

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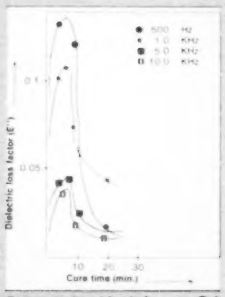


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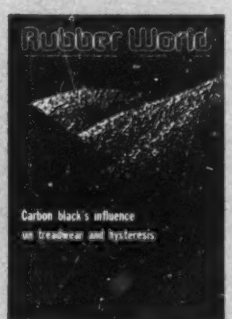


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**Cover photo of carbon black supplied by Exxon Chemical Americas, Houston, TX**

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## Price changes

**BFGoodrich** is undertaking a two-stage price increase totaling eight cents per pound for polyvinyl chloride resins. On June 1, a two-cent-per-pound discount for pipe-grade, siding, wire-and-cable, film-grade and general-purpose resins will be withdrawn. Goodrich initiated quarterly market pricing a year ago, and the two-cent-per-pound increase reflects withdrawal of discounts against its second-quarter list price. Also, bottle compounds and custom injection-molding compounds will return to list prices. The second stage of the increase will be effected July 1, when list prices will be raised six cents per pound on all vinyl suspension resins. These prices will be firm until October 1. The new market price for pipe-grade resin, for example, will increase to 44 cents per pound. In addition, on July 1, list prices of vinyl dispersion and blending resins will be increased by four cents per pound.

## Markets, news

The Malaysian Rubber Bureau reported total production of natural rubber in peninsular Malaysia was 1,477,676 tons, an increase of just 0.1% over the previous year. Standard Malaysian Rubber was the top export with 563,465 tons. Singapore imported 298,586 tons as the top importer with the U.S. next, importing 145,206 tons.

Although growth rates will remain below the peaks reached in the 1970s', demand for elastomers is expected to grow at about 1.9% per year according to William Eicher of Exxon Chemical Americas. Eicher forecasts a growth in the number of passenger tires produced of 0.7% per year through 1990. Rates for truck tires and other tires were 3.4% and 1.1%. Domestic consumption of carbon black is expected to grow at an annual average rate of about 1% per year form 1981 to 1990.

**Reichhold Chemicals** consolidated its vinyl compounds division and thermoplastic and elastomers division. The new operating unit will be known as the polyolefins & vinyl materials division with headquarters in Hackettstown, NJ.

Production of lead-free zinc oxide in February was up 24% over January 1983, but shipments were down 5% according to the Bureau of Mines.

**RMA monthly tire report through February 1983 (Figures in thousands of units)**

| **Passenger Tires** | **1983** | **1982** | **% Change** |
|---|---|---|---|
| Shipments | | | |
| Original Equipment | 5,445 | 4,406 | +23.58 |
| Radial | 4,573 | 3,661 | +24.91 |
| Replacement | 18,359 | 18,025 | +1.85 |
| Radial | 12,875 | 11,760 | +9.48 |
| Export | 539 | 498 | +8.23 |
| Radial | 298 | 271 | +9.96 |
| Total | 24,343 | 22,929 | +6.17 |
| Radial | 17,746 | 15,692 | +13.09 |
| Production | 25,382 | 25,114 | +1.07 |
| Radial | 17,633 | 16,612 | +6.15 |
| **Truck & Bus Tires** | | | |
| Shipments | | | |
| Original Equipment | 714 | 841 | −15.10 |
| Radial | 352 | 315 | +11.75 |
| Replacement | 3,935 | 3,913 | +0.56 |
| Radial | 1,278 | 1,094 | +16.82 |
| Export | 148 | 165 | −10.30 |
| Radial | 39 | 35 | +11.43 |
| Total | 4,797 | 4,919 | −2.48 |
| Radial | 1,669 | 1,444 | +15.58 |
| Production | 5,107 | 5,139 | −0.62 |
| Radial | 1,492 | 1,171 | +27.41 |


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# Rubber World

The technical service magazine for the rubber industry

Volume 188, No. 4 July 1983


## Automating rubber processing

## Annual Machinery & Equipment Issue

## Featuring Corporate Profile '83

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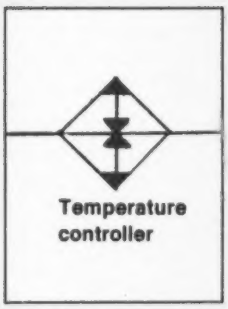
# Rubber World

Volume 188/Number4/July 1983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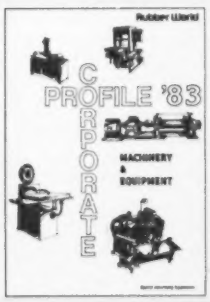
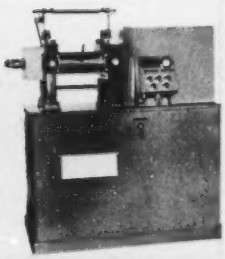



Corporate Profile CP1



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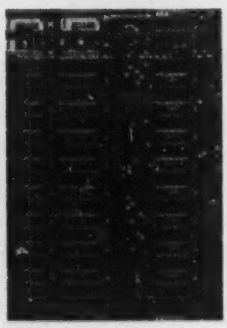

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## Cover

**Cover photo courtesy of Gould, Inc. Modicon Programmable Control, Div., Andover, MA.**

ABP

cent awareness that by-products of that specific curing reaction could, in association with high heat and high humidity aging, cause accelerated corrosion of contained metals.

ASTM Committee F-6 of Resilient Floor Coverings is currently working on a standard test method to measure the range of slip-resistance to be expected on linoleum, vinyl, rubber and other nontextile floors. A draft standard has been prepared to allow measurement of the static coefficient of friction of resilient floor coverings with an articulated strut type of tester. The subcommittee invites manufacturers to participate in a series of round-robin testing to develop the standard test method. The committee wants to establish the precision and accuracy of the test method; ascertain the range of values of slip-resistance to be expected; instruct potential users in the correct procedures for equipment operation; and to discover any potential difficulties in friction measurements on real samples of resilient floor coverings.

**Uniroyal** plans to close its Chicago Royalite thermoplastic manufacturing operations by December in a streamilining of that business. Overcapacity within the industry and other Uniroyal plants was given as the reason for the shutdown which will affect 97 wage and salary employees.

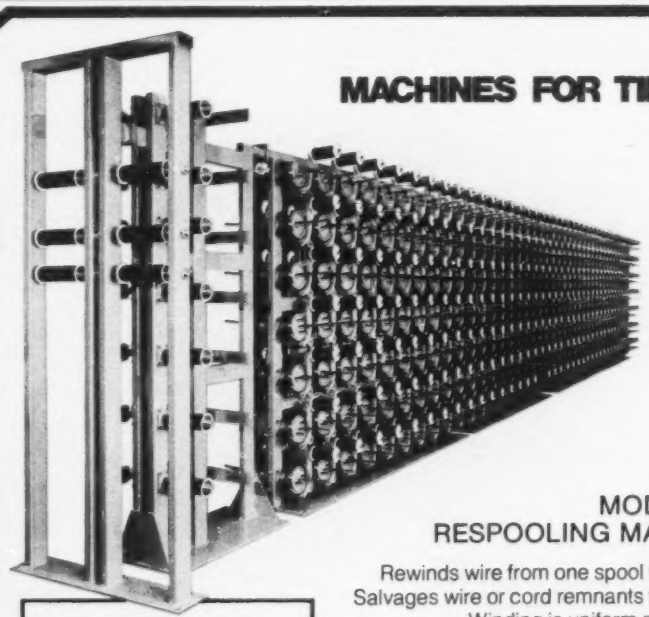
**Shell Oil** restructured its Products Organization into two divisions, a new division — Shell Refining and Marketing and Shell Chemical Co.

**Anderson International,** a manufacturer of capital equipment in Cleveland, OH, has filed for reorginazation under Chapter 11 of the Federal Bankruptcy Code.

The Interstate Commerce Commission has directed a number of railroads to lower their rates on a variety of recycled materials, including rubber. Illinois Central Gulf-Single-line Intradistrict West faces an additional reduction of 3.1%; Norfolk & Western-Single-line East additional reduction of 6.2% and N & W — Single-line West must reduce 3.3%, on hauling recycled rubber and plastic materials.

**RMA monthly tire report through March 1983**
**(Figures in thousands of units)**

| **Passenger Tires** | **1983** | **1982** | **% Change** |
|---|---|---|---|
| Shipments | | | |
| Original Equipment | 9,213 | 7,607 | +21.11 |
| Radial | 7,707 | 6,346 | +21.45 |
| Replacement | 29,372 | 29,019 | +1.22 |
| Radial | 20,160 | 19,132 | +5.37 |
| Export | 893 | 793 | +12.61 |
| Radial | 550 | 420 | +30.95 |
| Total | 30,478 | 37,419 | −18.55 |
| Radial | 28,417 | 25,898 | +9.73 |
| Production | 39,897 | 39,307 | +1.50 |
| Radial | 27,776 | 26,038 | +6.67 |
| Ending Inventory | 41,569 | 39,038 | +6.48 |
| Radial | 31,317 | 26,319 | +18.99 |
| **Truck & Bus Tires** | | | |
| Shipments | | | |
| Original Equipment | 1,178 | 1,337 | −11.89 |
| Radial | 581 | 510 | +13.92 |
| Replacement | 6,275 | 6,135 | +2.28 |
| Radial | 1,885 | 1,740 | +8.33 |
| Export | 243 | 269 | −9.67 |
| Radial | 93 | 58 | +60.34 |
| Total | 7,696 | 7,741 | −0.58 |
| Radial | 2,559 | 2,308 | +10.88 |
| Production | 7,971 | 7,997 | −0.33 |
| Radial | 2,447 | 1,856 | +31.84 |
| Ending Inventory | 8,718 | 8,779 | −0.69 |
| Radial | 3,756 | 2,736 | +37.28 |

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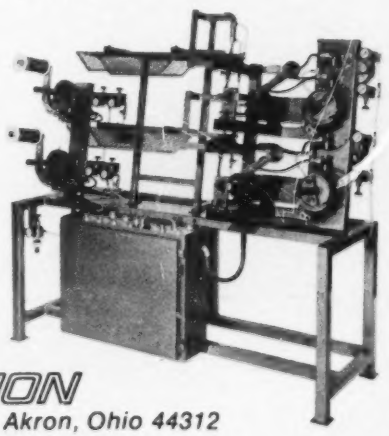

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# Rubber World

the rubber industry

Volume 188, No. 5



## Analysis of compound elastomers

Also: EPDM plasticizers

Converting scrap into compounding tool

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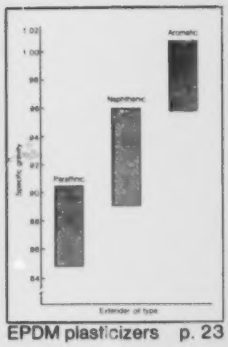
# Rubber World

Volume 188/Number 5/August 1983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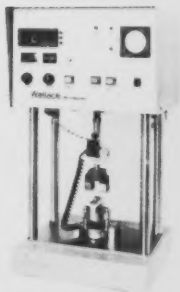

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## Cover

**Cover photo courtesy of Uniroyal**

$545.3 million with net income at $22.2 million. First half net income was $13 million on sales of $1.04 billion. The company also announced it had purchased three million shares of its common stock at $36 per share. The purchase was part of a block sale of Gulf & Western's holdings in the company, in all totaling over six million shares. The block trade set a New York Stock Exchange record for the largest single stock transaction, worth $216.7 million.

## Price changes

**CasChem** increased prices for some lines of its refined grades of castor oils along with dehydrated and polymerized castor oils between 5% and 7%.

The Film/Compound division of **Pantasote** increased prices five cents per pound for its flexible PVC film and four cents per pound for its flexible PVC compounds.

## Markets, news

The International Institute of Synthetic Rubber Producers' new long range forecast shows the percentage use of synthetic vs. natural rubber for the world as a whole will rise approximately two percentage points to 68.7% by 1992. According to the forecast, the next decade should see synthetic rubber demand rising 3.2% per year, one percentage point greater than that for natural. The centrally planned economy countries should experience a growth somewhat higher than that of the non-CPEC regions. SBR will continue to be the workhorse elastomer accounting for more than 30% of total new rubber consumption. Tire related products will account for 56% of


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**RMA industry rubber report through March 1983**
**(figures are expressed in metric tons)**

| | Cumulative 1983 | Cumulative 1982 | % Change 83 vs 82 |
|---|---|---|---|
| **Total New Rubber** | | | |
| New rubber available | 672,967 | 697,967 | -3.53 |
| Imports | 193,884 | 191,800 | 1.09 |
| Exports | 72,143 | 91,448 | -21.11 |
| Consumption | 594,424 | 613,612 | -3.13 |
| **Total Natural Rubber** | | | |
| Imports | 161,275 | 158,217 | -1.93 |
| Exports | 4,957 | 3,293 | 50.53 |
| Consumption | 164,308 | 165,361 | -.64 |
| % Total new rubber | 27.64 | 26.94 | |
| **Natural Rubber Dry** | | | |
| Imports | 143,474 | 145,098 | -1.12 |
| Exports | 2,670 | 1,259 | 112.07 |
| Consumption | 149,451 | 151,990 | -1.67 |
| **Natural Rubber Latex** | | | |
| Imports | 17,801 | 13,119 | 35.69 |
| Exports | 2,287 | 2,034 | 12.44 |
| Consumption | 14,858 | 13,371 | 11.12 |
| **Total Synthetic Rubber** | | | |
| Production | 479,083 | 505,797 | -5.28 |
| Imports | 32,609 | 33,583 | -2.90 |
| Exports | 67,186 | 88,155 | -23.79 |
| Consumption | 430,115 | 448,250 | -4.05 |
| % Total new rubber | 72.35 | 73.05 | |
| **Total SBR** | | | |
| Production | 229,344 | 239,825 | -4.37 |
| Imports | 12,524 | 14,887 | -15.87 |
| Exports | 19,655 | 26,260 | -25.15 |
| Consumption | 218,553 | 224,575 | -2.68 |
| **Total Nitrile** | | | |
| Production | 12,777 | 14,938 | -14.47 |
| Imports | 1,979 | 2,259 | -12.39 |
| Exports | 1,431 | 1,888 | -24.21 |
| Consumption | 13,326 | 15,174 | -12.18 |
| **Nitrile Dry** | | | |
| Production | 11,299 | 13,194 | -14.36 |
| Imports | 1,979 | 2,259 | -12.39 |
| Exports | 1,431 | 1,826 | -21.63 |
| Consumption | 11,814 | 13,467 | -12.27 |
| **Nitile Latex** | | | |
| Production | 1,478 | 1,744 | -15.25 |
| Exports | | 62 | -100.00 |
| Consumption | 1,512 | 1,707 | -11.42 |
| **Polybutadiene** | | | |
| Production | 81,285 | 82,503 | -1.48 |
| Imports | 7,239 | 7,476 | -3.17 |
| Exports | 3,525 | 4,097 | -13.96 |
| Consumption | 81,649 | 87,677 | -6.88 |
| **Ethylene-Propylene** | | | |
| Production | 39,314 | 31,767 | -23.76 |
| Imports | 22 | 45 | -51.11 |
| Exports | 7,457 | 6,444 | 15.72 |
| Consumption | 31,925 | 30,582 | 4.39 |
| **Butyl, Polyisoprene, Silicone and other Synthetic Elastomers** | | | |
| Production | 85,944 | 104,608 | -17.84 |
| Imports | 10,418 | 8,535 | 22.06 |
| Exports | 23,850 | 33,189 | -28.14 |
| Consumption | 65,147 | 72,839 | -10.56 |
| **Butyl** | | | |
| Imports | 7,212 | 6,573 | 9.72 |
| Exports | 7,803 | 15,604 | -49.99 |
| **Polyisoprene** | | | |
| Imports | 848 | 1,322 | -35.85 |
| Exports | 864 | 1,564 | -44.76 |
| **Polychloroprene** | | | |
| Production | 30,420 | 32,155 | -5.40 |
| Imports | 427 | 381 | 12.07 |
| Exports | 11,268 | 16,277 | -30.77 |
| Consumption | 19,515 | 17,403 | 12.14 |

the rubber used, with North America having the highest ratio of tire to non-tire consumption at 61%.

First quarter nonrubber footwear imports totaled 160.4 million pairs, up 23.6% from its peak year ago level according to the Footwear Industries of America. Imports share of this market reached a new high of 64.2%. Rubber/fabric footwear supply dropped 0.9% as the 6.6% drop in domestic production was mostly offset by a 2.9% gain in imports. Nonrubber and rubber/fabric footwear in combination indicated a healthy 35.2 million or a 13% gain from its 1982 level.

By the end of 1985 ethylene production economics will favor U.S. ethylene over Europe by eight cents per pound and 11 cents per pound better than Japan according to DeWitt & Co. a Houston-based petrochemical consulting firm. The company, in another report, said worldwide demand for benzene will jump over 10% this year. Growth in the U.S. is pegged at 3.5% between 1983 and 1984. The major end use will continue to be ethylbenzene and styrene, accounting for 54% of total U.S. demand.

**Goodyear** has resumed bias-ply truck production temporarily at its Jackson, MI plant but is phasing out the operation at the end of the year. The plant employed 600 when an explosion caused extensive damage, making radial production unfeasible when it reopened.

**Du Pont** said that an explosion and fire in the chloroprene unit of its La Place, LA facility wouldn't affect its supply of neoprene to its customers. Production capacities at other facilities as well as neoprene from other suppliers will be used to fill orders with production fully restored around the first of September.

**NRM Corp.** consolidated portions of its process systems and tire machinery divisions and received increased funds from its parent company enabling it to invest heavily into rotary blow molding machinery, advanced tire presses and tire building machines.

**Kelly-Springfield** is furloughing 534 hourly and salary employees at its Cumberland, MD bias truck tire plant. The plant will maintain its present production level for medium bias truck tires but consolidated light truck and farm production.

**RMA monthly tire report through April 1983**
**(Figures in thousands of units)**

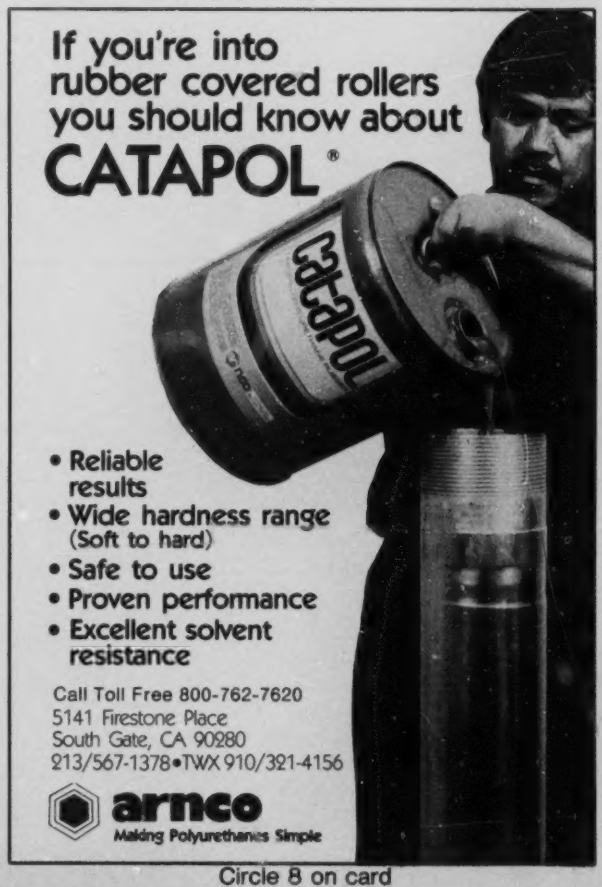
| Passenger Tires | 1983 | 1982 | % Change |
|---|---|---|---|
| Shipments | | | |
| Original Equipment | 12,924 | 10,829 | +19.35 |
| Radial | 10,808 | 9,041 | +19.54 |
| Replacement | 40,386 | 40,435 | −0.12 |
| Radial | 27,490 | 26,225 | +4.82 |
| Export | 1,262 | 1,046 | +20.65 |
| Radial | 816 | 543 | +50.28 |
| Total | 54,572 | 52,310 | +4.32 |
| Radial | 39,114 | 35,809 | +9.23 |
| Production | 53,641 | 51,735 | +3.68 |
| Radial | 37,472 | 34,176 | +9.64 |
| Ending Inventory | 42,810 | 37,710 | +13.52 |
| Radial | 32,743 | 25,514 | +28.33 |
| **Truck & Bus Tires** | | | |
| Shipments | | | |
| Original Equipment | 1,610 | 1,794 | −10.26 |
| Radial | 784 | 679 | +15.46 |
| Replacement | 8,446 | 8,371 | +0.90 |
| Radial | 2,586 | 2,376 | +8.84 |
| Export | 328 | 361 | −9.14 |
| Radial | 142 | 82 | +73.17 |
| Total | 10,384 | 10,526 | −1.35 |
| Radial | 3,512 | 3,137 | +11.95 |
| Production | 10,552 | 10,646 | −0.88 |
| Radial | 3,339 | 2,532 | +31.87 |
| Ending Inventory | 9,111 | 8,873 | −2.68 |
| Radial | 4,104 | 2,732 | +50.22 |

**IISRP rubber consumption forecast by type**
**(Non CPEC, all figures in m metric tons)**

| | 1982 | 1983 | 1987 | 1990 | 1992 |
|---|---|---|---|---|---|
| SBR — dry rubber | 2,290 | 2,362 | 2,687 | 2,928 | 3,062 |
| SBR — latex | 276 | 287 | 316 | 336 | 349 |
| Polybutadiene | 793 | 830 | 956 | 1,038 | 1,094 |
| Polyisoprene | 142 | 143 | 167 | 180 | 187 |
| Ethylene/propylene | 314 | 332 | 388 | 435 | 462 |
| Polychloroprene | 240 | 247 | 273 | 286 | 297 |
| Nitrile (dry & latex) | 165 | 172 | 194 | 209 | 219 |
| Other synthetics | 451 | 469 | 531 | 581 | 611 |
| Total synthetics | 4,671 | 4,842 | 5,512 | 5,993 | 6,281 |
| Natural | 2,887 | 2,969 | 3,279 | 3,514 | 3,662 |
| Total new rubber | 7,558 | 7,811 | 8,791 | 9,507 | 9,943 |
| % synthetic | 61.8 | 62.0 | 62.7 | 63.0 | 63.2 |

**IISRP rubber consumption forecast by region**
**(all figures in m metric tons)**

| Synthetic rubber | 1982 | 1983 | 1987 | 1990 | 1992 |
|---|---|---|---|---|---|
| North America | 1,794 | 1,914 | 2,186 | 2,304 | 2,378 |
| W. Europe, Africa, M. East | 1,416 | 1,435 | 1,560 | 1,629 | 1,669 |
| Asia and Oceania | 998 | 1,028 | 1,192 | 1,314 | 1,377 |
| Latin America | 463 | 465 | 592 | 746 | 857 |
| Eastern Europe | 2,400(e) | 2,450 | 2,700 | 3,000 | 3,300 |
| China/Asia CPEC | 121(e) | 132 | 161 | 227 | 261 |
| **Natural rubber** | | | | | |
| North America | 661 | 696 | 770 | 808 | 834 |
| W. Europe, Africa, M. East | 933 | 945 | 980 | 995 | 1,005 |
| Asia and Oceania | 1,108 | 1,141 | 1,288 | 1,418 | 1,492 |
| Latin America | 185 | 185 | 241 | 295 | 331 |
| Eastern Europe | 420 | 415 | 400 | 390 | 380 |
| China/Asia CPEC | 302 | 317 | 365 | 405 | 435 |
| **Total world** | | | | | |
| Synthetic rubber | 7,192 | 7,424 | 8,393 | 9,220 | 9,84 |
| Natural rubber | 3,609 | 3,701 | 4,044 | 4,309 | 4,47 |
| Total new rubber | 10,801 | 11,125 | 12,437 | 13,529 | 14,316 |
| % Synthetic | 66.6 | 66.7 | 67.5 | 68.1 | 68.7 |

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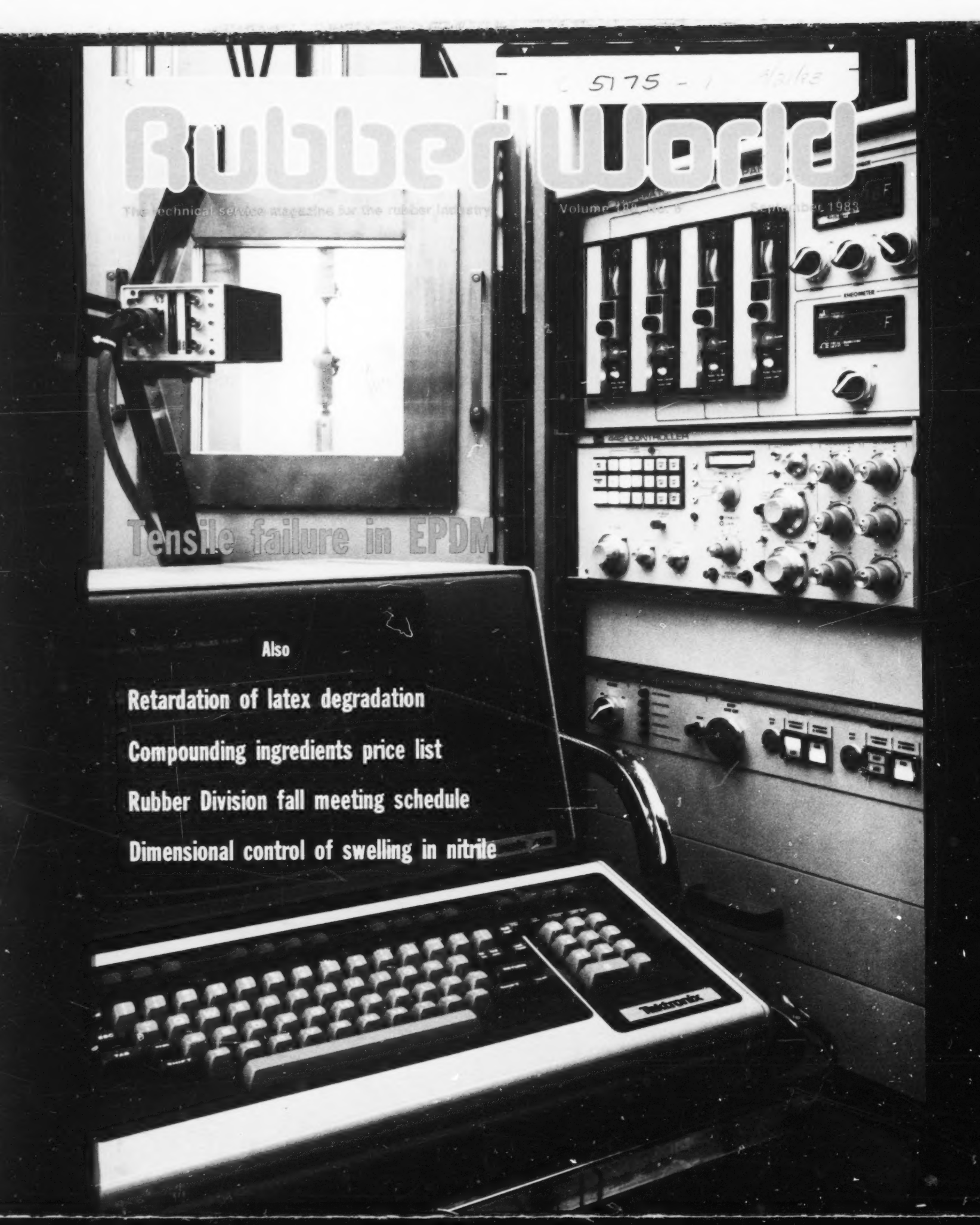
# Rubber World

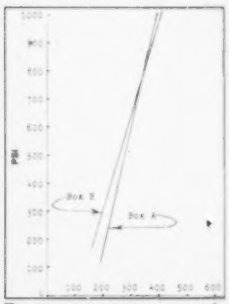
The technical service magazine for the rubber industry

Volume [illegible] Number 6 September 1983



# Rubber World

**Volume 188/Number 6/August 1983**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## Cover

**Cover courtesy of MTS Systems**

million on sales of $1,399.4 million.

**Uniroyal** reported second quarter earnings were $25.2 million on sales of $546 million.

## Markets, news

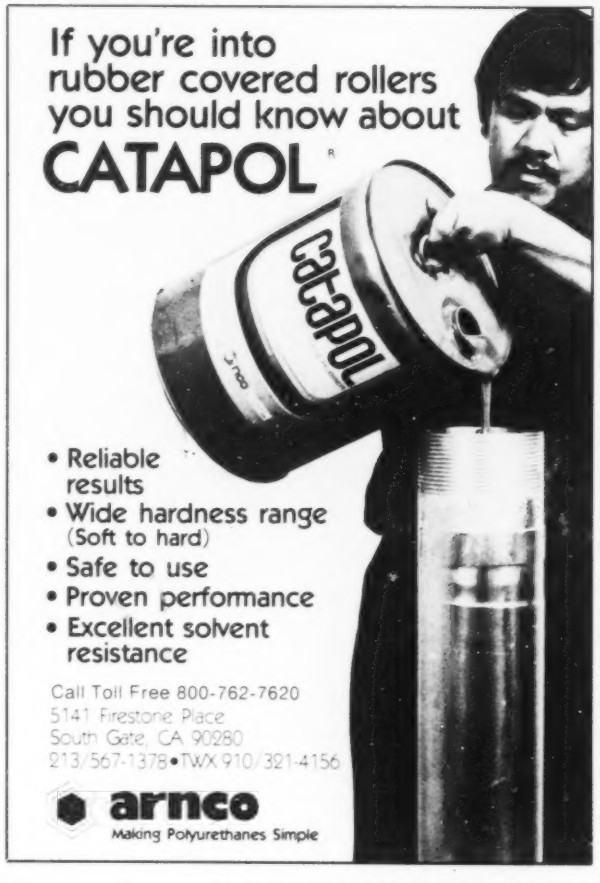
The U.S. carbon black industry's first quarter results are slightly better than the preceding fourth quarter but both production and shipments were down compared to previous first quarters. Shipments of 279 mmt was 2% lower than 1982 levels and the lowest since 1969. Production of 270 mmt was down 4% from 1982 and the lowest since 1975. Demand for all grades was down from the year earlier period, except N-100 (+23%), N-700(+4%) and N-300(+1%). Paralleling the carbon black industry, domestic dry rubber hydrocarbon consumption represented the lowest first quarter since 1967. Totalling 557 mmt, it was 11% below the year-ago level. Except polychloroprene (+12%) and EPDM(+4%) all polymers were off.

Goodyear is phasing out its industrial rubber products plant in Craigavon, Northern Ireland over the next several months affecting approximately 750 employees.

Kelly-Springfield has begun furloughing 534 hourly and salary employees at its Cumberland, MD bias truck tire plant.

The Plastics and Rubber Institute in conjunction with Vulnax International is sponsoring an award to be presented annually to what is judged as the best publication reporting on new technology which is of benefit to the practical end uses of rubber by a member of the Institute.

The Copenor steam cracker of the Cdf Chimie Group at Dunkirk, France recommended production after a month shutdown as a result of a fire in part of the steam cracker unit.

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**RMA monthly tire report through May 1983 (Figures in thousands of units)**

| Passenger Tires | 1983 | 1982 | % Change |
|---|---|---|---|
| Shipments | | | |
| Original Equipment | 16,596 | 14,358 | +15.59 |
| Radial | 13,847 | 12,011 | +15.29 |
| Replacement | 53,035 | 52,155 | +1.69 |
| Radial | 36,131 | 33,695 | +7.23 |
| Export | 1,589 | 1,240 | +28.15 |
| Radial | 1,056 | 664 | +59.04 |
| Total | 71,220 | 67,753 | +5.12 |
| Radial | 51,034 | 46,370 | +10.06 |
| Production | 65,995 | 64,131 | +2.91 |
| Radial | 45,813 | 42,566 | +7.63 |
| Ending Inventory | 34,521 | 36,319 | −4.95 |
| Radial | 25,421 | 24,834 | +2.36 |
| **Truck & Bus Tires** | | | |
| Shipments | | | |
| Original Equipment | 2,030 | 2,235 | −9.17 |
| Radial | 943 | 840 | +12.26 |
| Replacement | 10,797 | 10,640 | +1.48 |
| Radial | 3,442 | 3,060 | +11.48 |
| Export | 420 | 424 | −0.94 |
| Radial | 142 | 82 | +73.17 |
| Total | 13,247 | 23,299 | −0.30 |
| Radial | 4,552 | 4,006 | +13.63 |
| Production | 12,732 | 13,106 | −2.85 |
| Radial | 3,833 | 3,183 | +20.42 |
| Ending Inventory | 7,874 | 9,018 | −12.69 |
| Radial | 3,008 | 2,875 | +4.63 |

Shell Oil shut down a 300-ton-per-day chlor-alkali unit at its Deer Park, TX complex deciding it was more economical to purchase than continue operation.

**RMA industry rubber report through May 1983 (figures are expressed in metric tons)**

| | Cumulative 1983 | Cumulative 1982 | % Change 83 vs 82 |
|---|---|---|---|
| **Total New Rubber** | | | |
| New rubber available | 1,161,705 | 1,174,190 | −1.06 |
| Imports | 351,031 | 325,554 | 7.83 |
| Exports | 132,624 | 148,141 | −10.47 |
| Consumption | 999,196 | 1,028,490 | −2.85 |
| **Total Natural Rubber** | | | |
| Imports | 288,848 | 271,814 | 6.27 |
| Exports | 7,706 | 5,867 | 31.34 |
| Consumption | 276,509 | 286,480 | −3.48 |
| % Total new rubber | 27.67 | 27.85 | |
| **Natural Rubber Dry** | | | |
| Imports | 258,661 | 251,322 | 2.92 |
| Exports | 3,998 | 2,596 | 54.01 |
| Consumption | 252,253 | 264,291 | −4.55 |
| **Natural Rubber Latex** | | | |
| Imports | 30,187 | 20,492 | 47.31 |
| Exports | 3,708 | 3,271 | 13.36 |
| Consumption | 24,256 | 22,190 | 9.31 |
| **Total Synthetic Rubber** | | | |
| Production | 810,674 | 848,636 | −4.47 |
| Imports | 62,183 | 53,740 | 15.71 |
| Exports | 124,918 | 142,274 | −12.20 |
| Consumption | 722,687 | 742,010 | −2.60 |
| % Total new rubber | 72.32 | 72.14 | |
| **Total SBR** | | | |
| Production | 374,228 | 396,152 | −5.53 |
| Imports | 21,634 | 23,411 | −7.59 |
| Exports | 35,662 | 41,045 | −13.11 |
| Consumption | 361,335 | 371,129 | −2.64 |
| **Total Nitrile** | | | |
| Production | 21,935 | 23,705 | −7.47 |
| Imports | 3,351 | 3,589 | −6.63 |
| Exports | 2,526 | 2,848 | −11.31 |
| Consumption | 22,262 | 23,819 | −6.54 |

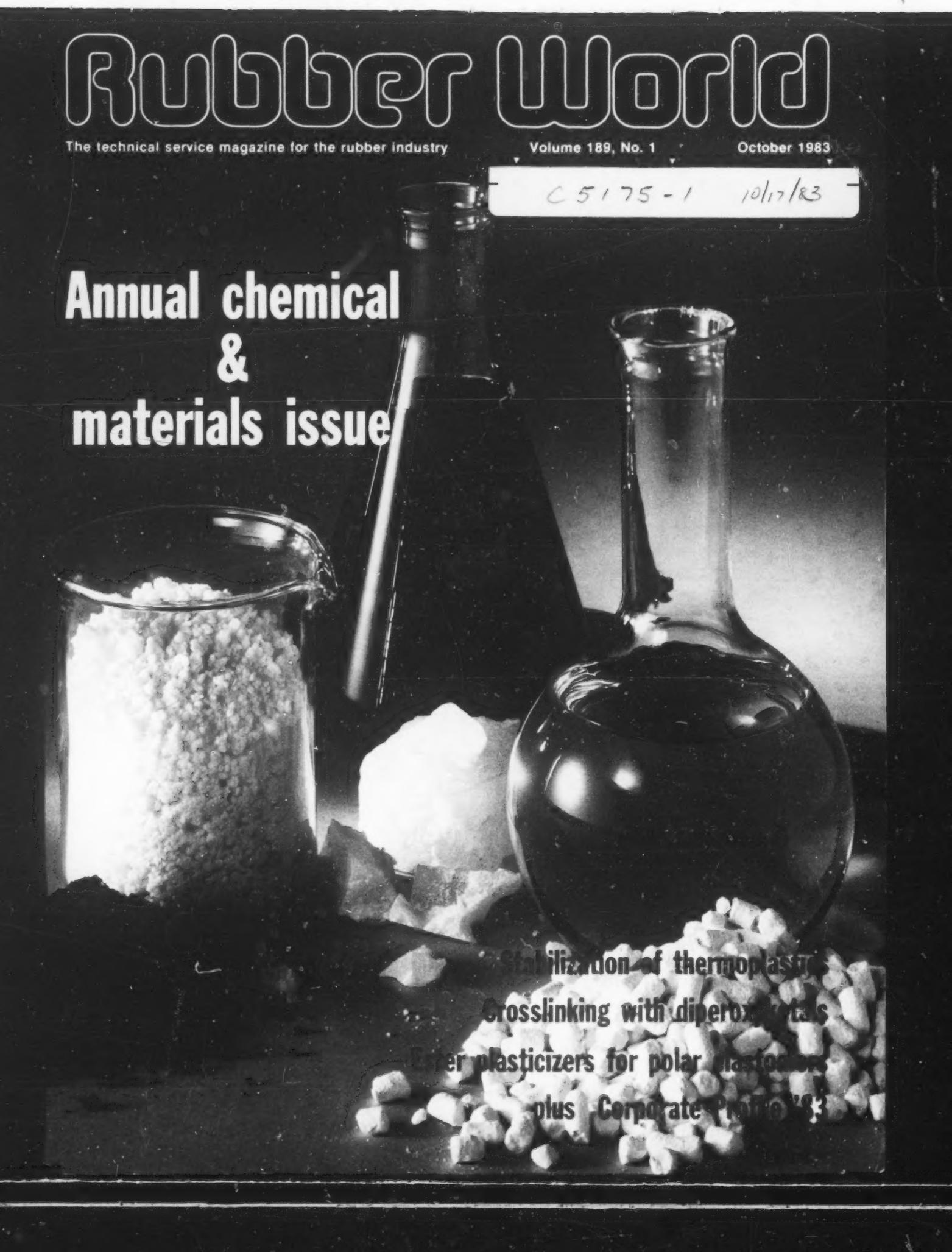
# Rubber World

The technical service magazine for the rubber industry

Volume 189, No. 1 October 1983

C5175-1 10/17/83

## Annual chemical & materials issue



Stabilization of thermoplastics

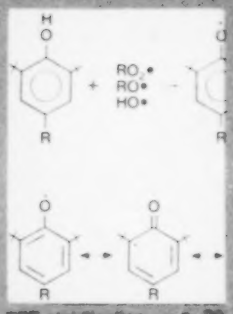
Crosslinking with diperoxy metals

Polymer plasticizers for polar elastomers

plus Corporate Profile '83

# Rubber World

Volume 189/Number 1/October 1983

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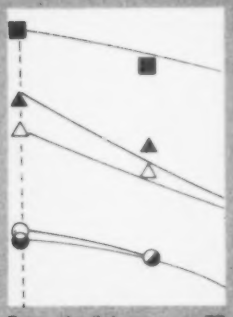

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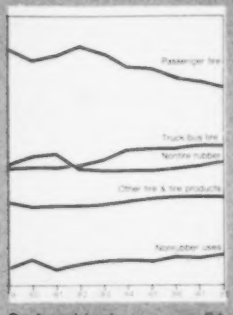

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## Cover

**Cover courtesy of R.E. Carroll Corp.**

**Louis P. Batson Inc.** is the exclusive sales agent in the U.S., Canada and Mexico for the complete line of **Gnata Fillipo** marking equipment for pipe.

**Bellofram** appointed **Smith Instrument and Equipment Co.,** Warren, MI as an authorized distributor.

## Price changes

**Union Carbide** increased prices for its PAN-based Thornel carbon fiber product line. Price increases were needed, the company said, to amortize the large capital investments in fiber production facilities, and to cover the sizable development costs. Some of the new prices: T-300 is $18/lb., T-500 is $21/lb. and T-250V is $15/lb. These are for 12K quantities.

**Synthetic Products Co.** is lowering the list prices of all standard grades of metallic stearates. This decrease in the list price follows the company's earlier announcement of a six cent per pound market price increase of its entire metallic stearate product line. New list prices are 75 cents per pound for calcium stearates and 85 cents per pound for zinc and magnesium stearates.

**Goodyear** raised the price of its polyethyelene terephthalate resin by five cents per pound.

**Hercules Inc.** increased prices of its polypropylene homopolymer resin four cents per pound and three cents per pound for its copolymer resin. Hercules also increased the prices of selected grades of oriented polypropylene film 7-15 cents per pound.

## Financial statements

**AccuRay Corp.** had a second quarter income of $1.5 million on sales of $30.1 million.

**Asarco** had net earnings for the second quarter of $27.5 million on sales of $380.3 million.

**Cabot's** net income for the third quarter was $14 million on sales of $388.9 million.

**Compo** reported third quarter net imcome was $475,000 on revenues of $22.4 million.

**Continental Products** posted earnings of $23.6 million on sales of $1.3 billion for 1982.

**Dayco Corp.** reported a profit of $625,000 on sales of $184.7 million for the third quarter.

**Eagle-Picher Industries** had earnings of $3.7 million on sales of $134.1 million in the third quarter.

**Firestone** reported net income of $31 million for the third quarter on sales of 992 million.

**Myers Industries** had a second quarter net income of $643,823 on sales of $19.7 million.

**Brad Ragan Inc.** reported first quarter earnings of $557,000 on sales of $43.3 million.

**Uniroyal** reported earnings for the second quarter were $25.2 million on sales of $546 million.

## Markets, news

U.S. foamed elastomer consumption is expected to experience an over 77% increase by 1995, expanding from 3.5 billion pounds in 1982 to over 6.1 billion pounds, according to a study from Predicasts, Inc., a Cleveland-based market research firm. Transportation, construction and packaging will have the greatest increase of usage.

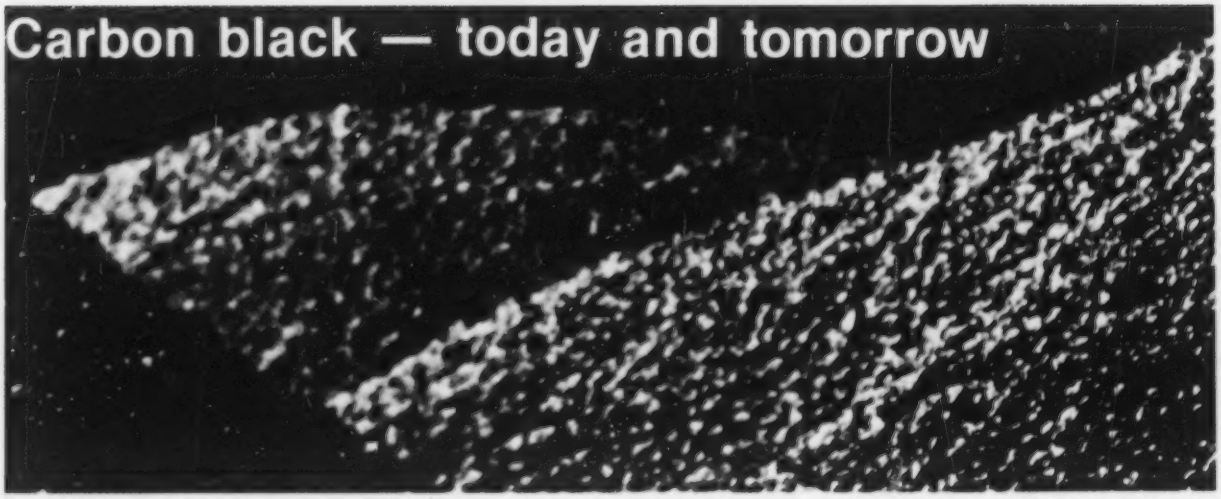
### RMA industry rubber report through June 1983 (figures are expressed in metric tons)

| | Cumulative 1983 | Cumulative 1982 | % Change 83 vs 82 |
|---|---|---|---|
| **Total New Rubber** | | | |
| New rubber available | 1,406,509 | 1,407,960 | -.10 |
| Imports | 431,337 | 402,497 | 7.17 |
| Exports | 159,489 | 175,723 | -9.24 |
| Apparent Consumption | 1,223,143 | 1,251,905 | -2.30 |
| **Total Natural Rubber** | | | |
| Imports | 355,093 | 336,218 | 5.61 |
| Exports | 9,064 | 6,876 | 31.82 |
| Apparent Consumption | 343,578 | 355,377 | -3.32 |
| % Total new rubber | 28.08 | 28.38 | |
| **Total Synthetic Rubber** | | | |
| Production | 975,172 | 1,005,463 | -3.01 |
| Imports | 76,244 | 66,279 | 15.03 |
| Exports | 150,425 | 168,847 | -10.91 |
| Apparent Consumption | 879,565 | 896,527 | -1.89 |
| % Total new rubber | 71.91 | 71.61 | |
| **Total SBR** | | | |
| Production | 449,735 | 463,057 | -2.88 |
| Imports | 26,577 | 29,064 | -8.56 |
| Exports | 42,051 | 48,213 | -12.78 |
| Apparent Consumption | 433,585 | 441,627 | -1.82 |
| **Total Nitrile** | | | |
| Production | 25,989 | 26,302 | -1.19 |
| Imports | 4,025 | 4,087 | -1.52 |
| Exports | 3,045 | 3,383 | -9.99 |
| Apparent Consumption | 27,054 | 27,800 | -2.68 |
| **Polybutadiene** | | | |
| Production | 160,518 | 157,054 | 2.21 |
| Imports | 17,998 | 14,473 | 24.36 |
| Exports | 7,934 | 7,416 | 6.98 |
| Apparent Consumption | 166,340 | 162,839 | 2.15 |
| **Ethylene-Propylene** | | | |
| Production | 81,615 | 66,233 | 23.22 |
| Imports | 208 | 102 | 103.92 |
| Exports | 16,129 | 15,323 | 5.26 |
| Apparent Consumption | 65,329 | 58,296 | 12.06 |
| **Butyl, Polyisoprene, Silicone and other Synthetic Elastomers** | | | |
| Production | 193,084 | 225,707 | -14.45 |
| Imports | 25,940 | 17,797 | 45.75 |
| Exports | 55,829 | 66,589 | -16.16 |
| Apparent Consumption | 145,869 | 169,019 | -13.70 |

### RMA monthly tire report through June 1983 (Figures in thousands of units)

| **Passenger Tires** | 1983 | 1982 | % Change |
|---|---|---|---|
| Shipments | | | |
| Original Equipment | 20,571 | 17,974 | +14.45 |
| Radial | 17,151 | 15,042 | +14.02 |
| Replacement | 65,935 | 64,437 | +2.32 |
| Radial | 45,131 | 41,300 | +9.28 |
| Export | 1,880 | 1,492 | +26.01 |
| Radial | 1,248 | 785 | +58.98 |
| Total | 88,386 | 83,903 | +5.34 |
| Radial | 63,530 | 57,127 | +11.21 |
| Production | 78,975 | 77,389 | +2.05 |
| Radial | 54,678 | 51,621 | +5.92 |
| Ending Inventory | 32,288 | 34,926 | -7.55 |
| Radial | 23,668 | 24,517 | -3.46 |
| **Truck & Bus Tires** | | | |
| Shipments | | | |
| Original Equipment | 2,516 | 2,693 | -6.57 |
| Radial | 1,152 | 1,014 | +13.61 |
| Replacement | 13,483 | 13,376 | +0.80 |
| Radial | 4,349 | 3,836 | +13.37 |
| Export | 513 | 508 | +0.98 |
| Radial | 242 | 125 | +93.60 |
| Total | 16,512 | 16,577 | -0.39 |
| Radial | 5,743 | 4,975 | +15.44 |
| Production | 15,225 | 15,517 | -1.88 |
| Radial | 4,587 | 3,854 | +19.02 |
| Ending Inventory | 7,334 | 8,549 | -14.21 |
| Radial | 2,707 | 2,8882 | -6.07 |

# Carbon black — today and tomorrow



*by Michael R. Beck, Jr. and Harold W. Hebermehl, J.M. Huber Corp., Akron, OH*

J.M. Huber's Marketing Services unit has developed market projections for carbon black through 1988. However, it should be emphasized that these projections are not in every case independent estimates and opinions of the J.M. Huber Corporation. They reflect a consolidation of information assembled from direct contacts with the marketing research departments of most tire companies and other rubber manufacturers. In simple terms, this is an industry forecast as we interpret the collective input.

The market is viewed historically from 1979 to the present and then is projected through 1988. Areas covered will include a detailed market breakdown by major end use segments, suppliers' manufacturing capacity, furnace black supply/demand projections, evolution of the thermal black market, and finally industry options involving carbon black choices.

As with most industries, it is no longer sufficient to project a single market. Various components of the market are changing at different rates. Actually, in most, they are declining over the 10 year span. There are also changing product requirements. These conditions demand tailoring business responses to individual segments when assessing needs for product mix and production facilities. Various end use market segments will be examined in detail for the period 1979 through 1988. In all cases one will recognize the overall dismal performance since 1979. There is some optimism projected, although the market will remain below 1979 levels in all segments, except perhaps non-rubber uses.

The total market is projected to decrease at the rate of 1.3% per year during the period 1979 through 1988. In absolute terms this is a drop of 360 million pounds. Of course within this period there is the initial experience of 1980, during which the carbon black market declined by about 21% or 680 million pounds. In 1982 a further decline to 2.31 billion pounds or about 29% lower than 1979 occurred. In fact shipments of furnace carbon black by U.S. producers to domestic customers during 1982 were at their lowest level since 1967.

1983 is expected to recover slightly, about 6% above the 1982 level, with somewhat smaller increases in succeeding years for a 3.8% annual rate over the 1982 through 1988 period. (Figure 1)

No massive cyclical recovery is anticipated and the 1979 total will not be exceeded by 1988.

**Tire markets**

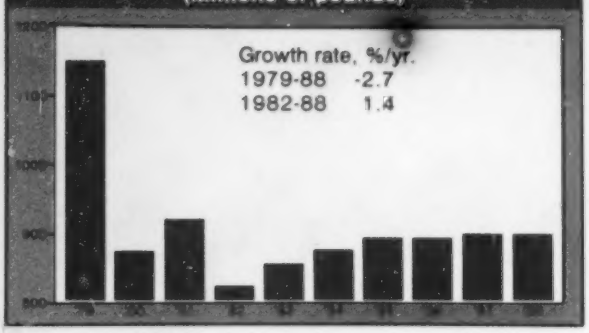
The total tire and tire products market consists of the passenger, truck/bus, and other tire and tire product segments taken collectively. A negative annual growth rate of 1.5% is projected for the 1979 through 1988 period. Commencing in 1983, the recovery is expressed at a 3.5% annual rate. In absolute terms 1988 consumption is predicted to be 290 million pounds less than 1979. (Figure 2)

Gasoline shortages, automobile downsizing, a high level of imports, the shift to higher mileage radial tires and other factors have all contributed to major woes within the carbon black industry in recent years. With some 70% of carbon black being consumed in tires and, tire products, changes in these markets have by far the major impact on the industry.

Figure 1 — Total U.S. carbon black (Millions of pounds)

Figure 2 — Carbon black to total tire and tire products (Millions of pounds)

Figure 3 — Carbon black to passenger car tires (Millions of pounds)




The largest single end use of carbon black is the passenger car tire segment. Production of passenger car tires was off by less than one percent in 1982 versus 1981 according to the year end RMA statistical report. However usage of carbon black in this segment dropped nearly 10%. If compared to 1979 the drop is almost 28%. Through the 1979-1988 period, passenger tire consumption of carbon black is projected at a negative annual rate of 2.7% and it probably will not reach the 1979 level again until well beyond the period discussed here. (Figure 3)

The inexorable effect of downsizing is well recognized. Tread compounds for the new design low rolling resistance tires contain less black. A lower synthetic ratio has also contributed to this trend.

Although factory shipments of tires in 1988 are expected to exceed those of 1979 the increase in the number of units will not be great enough to offset the effect of smaller units on carbon black consumption.

This will occur even though the downsizing of small trucks will shift tire type used on some models from light truck to passenger car size. An overall decrease of about 1.2 pounds of carbon black per passenger tire is anticipated over the period. The drop which, of course, has been greatest in the OE component will spread into the replacement market as we proceed through the forecast period.

Figure 4 — Carbon black to truck/bus tires (Millions of pounds)

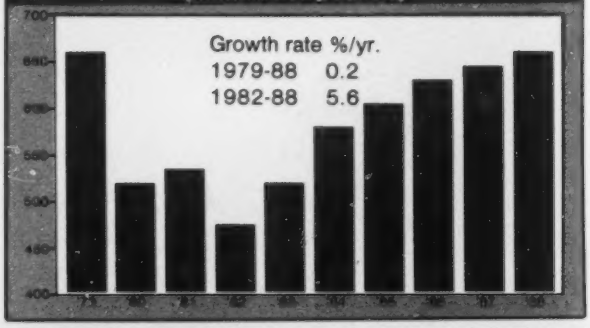



Figure 5 — Carbon black to other tires & tire products (Millions of pounds)

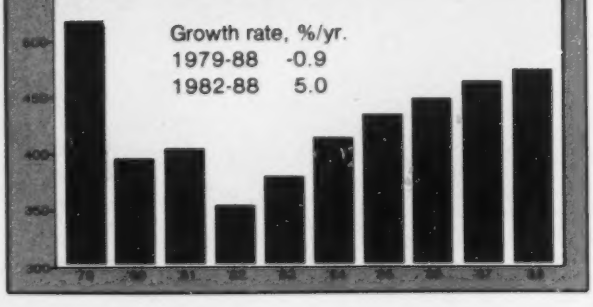
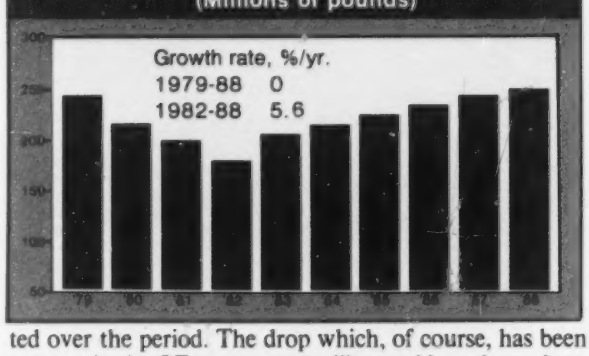



Figure 6 — Carbon black to nontire rubber uses (Millions of pounds)

Figure 7 — Carbon black to nonrubber uses (Millions of pounds)




The truck/bus segment is the only rubber industry market that is projected to return to the 1979 level. The annual growth rate of 5.6% after 1982 is the highest in the tire and tire products sector. Shipments of light truck sizes will remain relatively stable beyond 1982 with some fall off into the passenger car segment as previously mentioned. (Figure 4)

Increased shipments for medium truck and bus and OTR sizes are projected throughout the period. In addition, an increase in the average pounds of carbon black per tire will occur, caused by a shift to larger tire sizes within the segment.

Slower growth in the later years of the forecast period is projected in the medium truck category and is based on the continued transition toward radials and increased use of retreads.

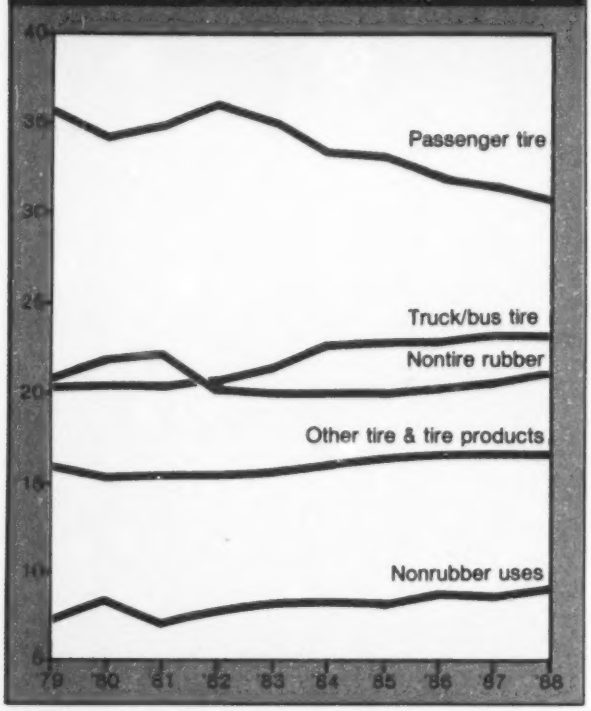
Other tire and tire products is a segment which includes such items as tread rubber, farm and implement tires, flaps, airplane tires, tubes, and bladders. (Figure 5)

The overall annual rate is again a negative 0.9%. the recovery beyond 1982 is projected at a 5.0% annual rate. This is due in part to tread rubber shipments and small and large farm tire shipments returning to their respective 1979 levels by the end of the forecast period. Forecasting from a depressed year also tends to maximize the growth rate figure.

**Nontire markets**

The non-tire rubber use segment includes such items as custom mixing, roofing membrane, hose and belts, and miscellaneous mechanical rubber goods. While the automotive industry is also a major market for the goods produced by this segment other markets such as industrial applications and housing construction consume a major portion. As single family housing starts and industrial pro-

Figure 8 — Carbon black end uses
(Percent of U.S. market)




duction recover and as consumer confidence is reflected in increased spending, the non-tire rubber market will follow. Yet an overall negative annual rate of 1.2% is projected over the 1979 through 1988 period. The pickup beyond 1982 is projected at a 4.2% annual rate. (Figure 6)

The non-rubber use category is the smallest carbon black consuming segment and includes such end uses as inks, plastics, and refractory. This market segment suffered the least from 1979 to present and is expected to return to the 1979 level by 1988. (Figure 7)

Figure 8 shows the main market segments as a percent of the total domestic market. The decline of the passenger car tire sector is from about 35% in 1979 to 31% in 1988. The increasing effect of high mileage radial tires, downsizing of replacement tires (as well as OE), and lower black loadings for better rolling resistance all contribute to this trend. The truck/bus sector trend projects upwards from about 20% of the market to 23% in 1988. The other market sectors will remain relatively flat over the forecast period. All of the preceeding information included both furnace black and thermal black data.

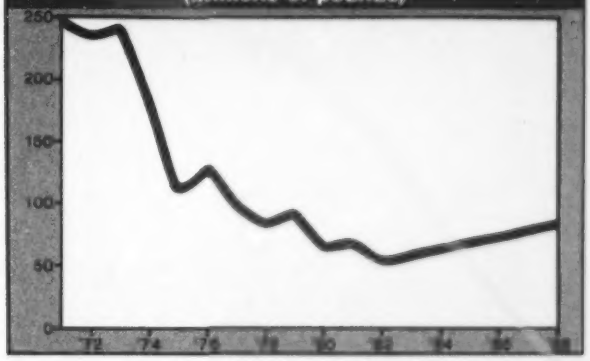
**Manufacturing capacity**

The U.S. thermal black market has come down from the 250 million pound level in 1972 to something less than 100 million pounds but has leveled off. It will remain relatively stable responding to the vagaries of the marketplace. The precipitous decline in thermal black usage is behind us and mild growth is projected. (Figure 9)

The present market for thermal black is one that requires the properties afforded by its unique, large particle size, i.e., high loadings, low hysteresis, low compression set, low permeability, and high volume resistivity.

Turning to the furnace black supply side of the business there are 23 carbon black plants currently operating with a maximum capacity of about 3.3 billion pounds per year (which may be a conservative figure). This is down

Figure 9 — U.S. thermal black market
(Millions of pounds)



from approximately 4 billion pounds in 1978 because of the shutdowns of 7 plants by five of the seven producers. (Figure 10)

Geographically speaking the Gulf Coast plants are probably best positioned with respect to feedstock supply. The inland southwest plants are not as well situated although this is not true in every case.

It should also be noted that new tire plant manufacturing capacity additions have, over the past ten years, been in the southeastern and southwestern states and away from the older locations of the West Coast and Northeast. Furthermore, most of the tire plants which have been closed were located in the Northeast and the West. This, at best, places most of the remaining carbon black plants in the all other category at a disadvantage.

Note also that nameplate capacity is split almost evenly between hard and soft blacks. There is some swing capacity in place which could alter this ratio, although that is sometimes easier said than done.

Figure 11 shows the relationship of projected furnace demand to carbon black operating capacity. The lower curve represents annual demand over the forecast period. The upper curve represents an added 10% which while somewhat arbitrary is the assumed minimum required ca-

Figure 10 — U.S. furnace black production capacity (Millions of pounds)

| | Hard | Soft | Total | No. of plants |
|---|---|---|---|---|
| • Gulf coast | 950 | 750 | 1,700 | 9 |
| • Inland southwest | 450 | 600 | 1,050 | 9 |
| • All other | 300 | 250 | 550 | 5 |
| Total nameplate capacity | 1,700 | 1,600 | 3,300 | 23 |

Figure 11 — Furnace black capacity requirements
(Millions of pounds)

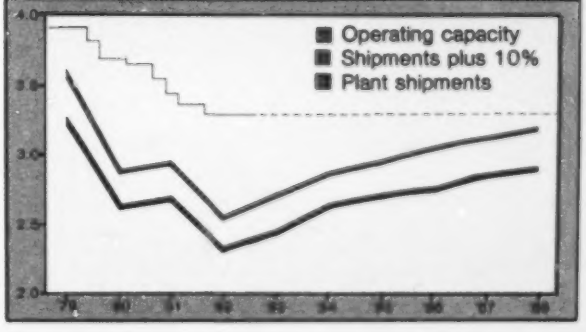


Figure 12 — Industry hard black patterns

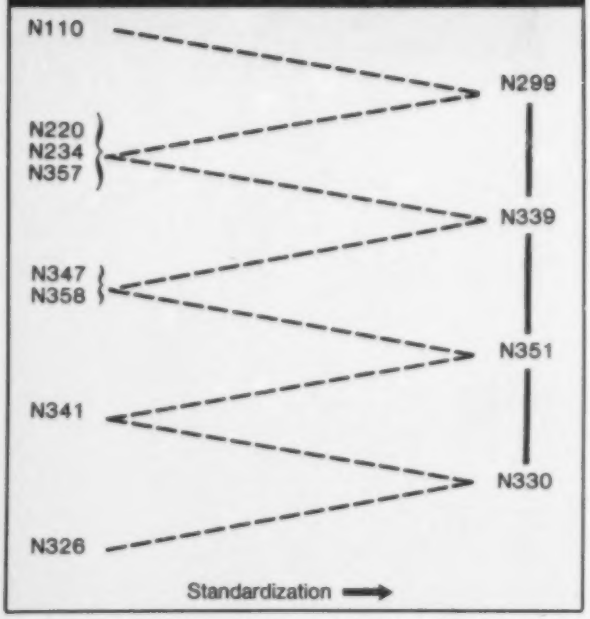
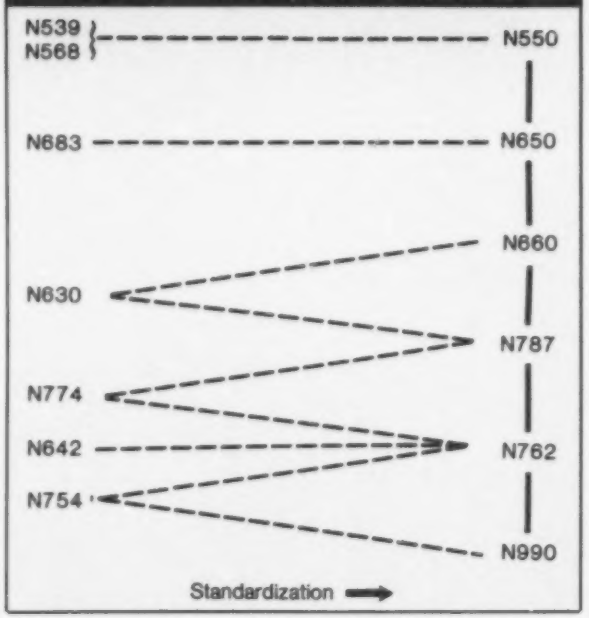



Figure 13 — Industry soft black patterns




pacity necessary to meet demand. This excess capacity is needed to provide uninterrupted service by covering seasonal shipping variations, maintenance turnarounds, etc. The stepped line is the actual nameplate capacity in place since 1978.

There is sufficient excess capacity to meet projected demand through 1988 (assuming no further plant shutdowns). The industry has averaged two plant shutdowns per year for the last three years and further plant closings are certainly possible. The carbon black industry ran at somewhat less than 70% of capacity in 1982 and, if these demand projections hold, it still indicates a 13% capacity overhang in 1988.

Given all of the preceeding it should be obvious that there are extreme pressures to operate more efficiently. Whether or not supply and demand are brought into line through additional plant closings attention must be given to improving efficiencies of production.

**Carbon black rationalization**

Production efficiency can be greatly aided by carbon black rationalization. Huber adds its voice to those within our industry calling for rationalization of carbon blacks. We define rationalization as optimizing product mix in order to maximize product volume. Many suppliers have already begun to selectively rationalize their product lines. Huber produces only 17 carbon black grades of the 40 listed by ASTM classification document D1765-82. In reality, there are probably ten or more low volume rubber-grade blacks within the industry that have not received ASTM classification.

The current marketing conditions pre-empt any strong supplier based consilidation of grades. Support must come from the consuming side as well. We recognize how difficult it is for carbon black users and producers alike to agree on which blacks, specifications, and tests should be considered "standard."

The following guidelines are offered as a means of supporting the rationalization effort. The joint goal should be to optimize product mix by reducing the number of carbon blacks required to as few as possible. This will enable producers to maintain longer production runs and generate carbon black of the highest quality and uniformity. It will also permit more efficient use of storage and rail car capacity.

Specifications should be established and revised through consultation with the carbon black producers. The best specification is one that defines the black as it is most commonly produced. By having specifications "in the slot" one avoids non-standard testing, non essential testing, and more importantly, maintains the proper balance of properties.

**Industry options**

The hard black choices have been influenced by the popularity of N299 which has been used to replace both N100 series and N200 series blacks. N339 remains a popular grade while N351 has gained some momentum due to its lower hysteresis. N330 remains an industry workhorse although N326 is popular in some steelcord and MRG applications. (Figure 12)

There can also be vertical interchangeability between neighboring blacks in some applications. The industry soft black picture is a bit more congested, especially at the lower structure end of the range. (Figure 13)

N550 and N650 are the popular high structure grades. N550 is predominantly a tire grade black while N650 is a standard in the non-tire, MRG industry. N660 is the industry workhorse for a multitude of tire and non-tire applications. There are several choices at DBP levels below N660. It is feasible that only N660, N762 and N990 need be produced to cover these applications. Of course recompounding would be necessary and blending of blacks may be required.

The carbon black industry has undergone severe change since 1979 and the situation has not yet stabilized. More changes may be imminent. Suppliers must utilize all means at their disposal to reduce operating costs and to improve production efficiency. Clearly, the problems facing the carbon black industry today are serious but they are not insoluble. **RW**